

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Withdrawn) A semiconductor device comprising:
a semiconductor region including silicon; and
a dielectric film including silicon, oxygen, nitrogen, and helium, the dielectric film provided on the semiconductor region, and the dielectric film having a concentration distribution with respect to a film thickness direction, the concentration distribution having a maximal value of concentration of the helium in a surface portion on the semiconductor region side and a maximal value of concentration of the nitrogen in a surface portion on a side opposite to the semiconductor region.

2. (Withdrawn) A semiconductor device comprising:
a semiconductor region including silicon; and
a dielectric film including silicon, oxygen, and nitrogen, the dielectric film provided on the semiconductor region, and the dielectric film having a concentration distribution with respect to a film thickness direction, the concentration distribution having a first maximal value of concentration of the nitrogen in a surface portion on the semiconductor region side and a second maximal value of concentration of the nitrogen in a surface portion on a side opposite to the semiconductor region.

3. (Withdrawn) The semiconductor device according to claim 2, wherein the maximal value of the first nitrogen concentration is smaller than that of the second nitrogen concentration.

4. (Withdrawn) The semiconductor device according to claim 1, wherein the insulating film is a capacitor insulating film or gate insulating film.

5. (Withdrawn) The semiconductor device according to claim 2, wherein the insulating film is a capacitor insulating film or gate insulating film.

6. (Withdrawn) The semiconductor device according to claim 3, wherein the insulating film is a capacitor insulating film or gate insulating film.

7. (Withdrawn) The semiconductor device according to claim 1, wherein the semiconductor region is a silicon substrate, SOI substrate, or SiGe substrate.

8. (Withdrawn) The semiconductor device according to claim 2, wherein the semiconductor region is a silicon substrate, SOI substrate, or SiGe substrate.

9. (Withdrawn) The semiconductor device according to claim 3, wherein the semiconductor region is a silicon substrate, SOI substrate, or SiGe substrate.

10. (Currently Amended) A method of manufacturing a semiconductor device comprising:

forming a silicon oxide film on a semiconductor region including silicon;
heating the semiconductor region and silicon oxide film in a helium gas atmosphere, said atmosphere not including a helium plasma; and

forming an insulating film including silicon, oxygen, nitrogen, and helium by nitriding the silicon oxide film.

11. (Original) The method of manufacturing the semiconductor device according to claim 10, wherein heating the semiconductor region and the silicon oxide film in the helium atmosphere is performed so that helium is introduced into an interface portion between the semiconductor region and the silicon oxide film.

12. (Withdrawn) A method of manufacturing a semiconductor device comprising:

forming a silicon oxide film on a semiconductor region including silicon;
and

forming an insulating film including silicon, oxygen, and nitrogen by nitriding the silicon oxide film and changing a film forming condition at least once in the course of formation of the insulating film.

13. (Withdrawn) The method of manufacturing the semiconductor device according to claim 12, wherein changing the film forming condition at least once in the course of formation of the insulating film is performed so that nitrogen is introduced into an interface portion between the semiconductor region and the silicon oxide film and into a surface portion of the silicon oxide film on a side opposite to the interface portion.

14. (Original) The method of manufacturing the semiconductor device according to claim 10, wherein the silicon oxide film is nitrided by a plasma of a material including nitrogen.

15. (Withdrawn) The method of manufacturing the semiconductor device according to claim 12, wherein the silicon oxide film is nitrided by a plasma of a material including material.

16. (Withdrawn) The method of manufacturing the semiconductor device according to claim 12, wherein the semiconductor region and the silicon oxide film are laid on a holding electrode in a vacuum chamber in which a gas of a material including

nitrogen and an inert gas are introduced, the silicon oxide film is nitrided by a plasma of the material including the nitrogen, and the film forming condition is at least one of a pressure in the vacuum chamber, excitation power for generating the plasma, temperature of the holding electrode, bias voltage applied to the holding electrode, and flow rate ratio of the gas of the material including the nitrogen and the inert gas.

17. (Original) The method of manufacturing the semiconductor device according to claim 10, wherein a film thickness of the silicon oxide film is not more than 2.5 nm.

18. (Withdrawn) The method of manufacturing the semiconductor device according to claim 12, wherein a film thickness of the silicon oxide film is not more than 2.5 nm.

19. (Original) The method of manufacturing the semiconductor device according to claim 10, wherein a film thickness of the silicon oxide film is not more than 1.4 nm.

20. (Withdrawn) The method of manufacturing the semiconductor device according to claim 12, wherein a film thickness of the silicon oxide film is not more than 1.4 nm.